

FOLDING VEHICLE SEAT

BACKGROUND

[01] The invention relates to a folding passenger seat for agricultural or industrial utility vehicles.

[02] A folding passenger seat with a foot support for agricultural vehicles is described in published German patent application no. DE-A-22 27 659. The seat surface has four spars which form a rectangular seat frame which is covered with fabric. A rear spar of the seat frame is supported in pivot bearings fastened to the vehicle fender, so that the seat frame can be pivoted upward about a horizontal axis to a position against a shell of the fender. This very simple passenger seat is not very comfortable, lacks upholstery and back rest, and appears to be intended primarily for children.

[03] German patent no. 21 59 689 C3 describes a passenger seat for vehicles such as tractors, towing vehicles, construction vehicles, etc., which can be pivoted into an out-of-service position, which includes a multi-part linkage connected by hinges, and which is to be retained by chain-like connections or loops in in-service and out-of-service positions. The orientation of the passenger seat may be changed by changing the positions of hanging of the chain connections. However, otherwise the configuration does not meet today's safety requirements since the connecting chains permit neither a locking nor an exact positioning of the seat position.

SUMMARY

[04] Accordingly, an object of this invention is to provide a vehicle seat which is comfortable and which can be folded.

[05] A further object of the invention is to provide such a folding passenger seat which is light weight and which can be operated easily.

[06] A further object of the invention is to provide such a seat which occupies little space in its folded, out-of-service position, so that an unimpeded access to the operator's seat of the vehicle is assured.

[07] A further object of the invention is to provide such a seat which is supported in a stable condition in its seat position as well as in its out-of-service position and which is safe.

[08] These and other objects are achieved by the present invention wherein a rear part of a vehicle seat includes a sliding bearing mechanism so that the seat member is both slidable and pivotal with respect to the vehicle body when the seat is

folded upward from its seat position into its out-of-service position. The sliding bearing mechanism slides from an upper position along a guide into a lower position and simultaneously rotates relative to the guide. Preferably, the seat includes a back rest and a seating member which has a seating surface. The seat member contacts the back rest when it is folded upward. When the seat member is in its folded position, the forward edge of the seat member does not project beyond the upper edge of the back rest because the seat member is lowered as it is rotated into its folded position. This permits the use of a comfortable seat member with a sufficiently long seat surface.

BRIEF DESCRIPTION OF THE DRAWINGS

- [09] Fig. 1 is a side view of a folding passenger seat according to the invention with the seat pivoted downward into the seating position.
- [010] Fig. 2 is a side view of a vehicle seat of Fig. 1 in half-raised position.
- [011] Fig. 3 is a perspective view of a vehicle seat of Fig. 1 in a fully raised position.
- [012] Fig. 4 is a view of a back rest with a first plate attached to it.
- [013] Fig. 5 is a perspective view of a second plate.
- [014] Fig. 6 is a perspective view of a third plate.

DETAILED DESCRIPTION

- [015] Figs. 1 - 3 show a folding vehicle seat which may be used in an agricultural utility vehicle such as a tractor, and which may be positioned alongside the operator's seat and used as a passenger seat. The vehicle seat includes a seat member 10, with a seat surface 12, a front edge 14 and an underside 16 as well as a back rest 18 with a back surface 20 and an upper edge 22.
- [016] The back rest 18 is rigidly fastened to a guide 24. Guide 24 is rigidly fastened by means of screws 26 to a console (not shown) in a vehicle cab (not shown). The console is not vertical, but extends at an angle to the vertical of approximately 65°, so that in the assembled condition, the guide 24 also extends in this direction. In Fig. 1, the seat member 10 is shown in its lowered or seated position. In Fig. 2, the seat member is shown in an intermediate position, and in Fig. 3, the seat member is in a raised, pivoted upward, and out-of-service position.

[017] The guide 24 is formed by a first plate 28, a second plate 30 and connectors such as screws 26 and spacer sleeves 32 which are arranged between the two plates 28, 30 and through which the screws 26 extend. As best seen in Figs. 4 and 5, the screws 26 extend through bores 34, 36 in the first plate 28 and the second plate 30. The spacer sleeves 34 hold the two plates 28, 30 spaced apart and parallel to each other, forming a space 38 therebetween which has a constant width.

[018] The first plate 28 has a first leg 40 which forms the guide 24 and a second leg 42 which extends into and is attached to the back rest 18. The first plate 28 is preferably made of a planar sheet metal. A lower end 44 of plate 28 has a central slot 46 which has a section 48 which opens in the shape of a cone to the edge of the plate 28.

[019] The second plate 30 includes a first planar leg 50 which forms part of the guide 24 and a second planar leg 52 which extends from leg 50. The second plate 30 is angled so that its two legs 50, 52 extend at an angle of approximately 115° to each other. An end of the second leg 52 forms a bearing support 54 which includes two brackets 56 located opposite each other. Bores 58 extend through the brackets 56 and define a pivot bearing axis. A longitudinal slot 60 in the second plate 30 extends from the bend 62 between the legs 50 and 52 through leg 52 and into the bearing support 54. The slot 60 has a uniform width except for an enlarged portion 64. The enlarged portion 64 is located in the second leg 52 remote from the bend 62 and close to the bearing support 54. The second plate 30 can be manufactured from sheet metal and cut to corresponding size and bent.

[020] As best seen in Fig. 6, third plate 66 includes a first planar leg 68 and a second planar leg 70. The third plate 66 is also angled so that legs 68, 70 extend at angles of approximately 115° to each other. A pair of cylindrical bearing elements 72 are supported at free end 71 of the leg 68. Each bearing element 72 includes a larger diameter section 74 and a smaller diameter pin 76. The diameters of the pins 76 conform to the width of the space 38 between the first and second plates 28, 30. The pins 76 can slide and rotate in the space 38. A side of section 74 of each bearing element 72 is fastened to a side of the free end 71 of leg 68, such as by welding, so that the pins 76 face each other and form an axis. A slot 78 is formed in

the center of end 71 and a tab 80 projects into the center of slot 78.

[021] Plate 66 forms a bend 82 between the legs 68, 70. A bore 84 extends through the bend 82 and receives a locking element or pin 86 (best seen in Fig. 3). As best seen in Fig. 1, pin 86 includes a shank and a head 87. The shank of pin 86 is dimensioned so that it can slide and be shifted within the longitudinal slot 60 of the second plate 30. However, the diameter of the head region 87 is larger than the width of the longitudinal slot 60. It can be inserted into and retracted from the slot 60 only in through the enlarged slot portion 64.

[022] The seat member 10 is preferably bolted to the second leg 70 of plate 66. A pin 88 projects on the underside 16 of the seat member 10 or from the third plate near the pin 86.

[023] The third plate 66 can be latched together with the seat member 10 into the guide 24 so that the pins 76 are received by the space 38 between plates 28, 30, and the head 87 of pin 86 is inserted through the enlarged slot portion 64 of the slot 60 of the second plate 30. The bearing elements 72 can be slid within the guide between an upper end position and a lower end position. If the seat member 10 is located in the seated position shown in Fig. 1, the bearing elements 72 assume an upper position. If the seat member 10 is pivoted upward out of this position, so that its front edge 14 is raised, then the head 87 of pin 86 is guided in the longitudinal slot 60 and prevents the third plate 66 from being pivoted away from the second plate 30, and allows only a relative sliding movement along the slot 60. Simultaneously, the bearing elements 72 move downward in the guide 24 until they reach their lower end position, as is shown in Fig. 2. In the lower end position the pin 86 reaches the enlarged slot portion 64 so that the head 87 of pin 86 can exit from the slot 60. If the seat member 10 is raised further, it pivots about the axis of the bearing elements 72 along with the third plate 66 until the seat surface 12 comes into contact with the back surface 20. During this movement the seat member 10 has been lowered to such a point that its front edge 14 does not project upward above the upper edge 22 of the back rest 18, as best seen in Fig. 3.

[024] When the seat member 10 is fully pivoted and folded upward, the tab 80 of the third plate 66 moves into the slot 46 of the first plate 28. The insertion is simplified by the cone shaped configuration of the slot 46. This fixes the rear portion of the seat member 10, so that a stable location of the seat member 10 is assured in its folded upward position, wherein the rear seat portion will become the lowest part of the seat.

[025] In order to support the upward pivoting of the seat member 10, an actuating lever 90 is pivotally coupled at the pivot bearing axis 58. Two pulleys 92 are mounted at the sides of the central portion of lever 90. A spring 94 urges the lever 90 towards the underside 16 of the seat member 10, so that when the seat member 10 is pivoted upward the pulleys 94 roll along the underside 16 and transmit the spring force to the seat member 10. A bracket 96 is mounted on the lever 90 and has an end which extends towards the seat member 10. A handgrip 98 projects from an end of lever 90. As best seen in Fig. 3, when the seat member 10 is pivoted completely upward, the end of bracket 96 engages the third plate 66. If a force is applied to the seat member 10 to fold the seat member 10 downward, then pin 88 engages bracket 96 and prevents a folding movement. The seat member 10 can be folded down only if the operator grasps handgrip 98 and pivots the actuating lever 90 away from the underside 16 of the seat member 10, so that the bracket 96 disengages from pin 88.

[026] While the present invention has been described in conjunction with a specific embodiment, it is understood that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, this invention is intended to embrace all such alternatives, modifications and variations which fall within the spirit and scope of the appended claims.